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A SCIENTIFIC VIEW OF HUMAN CHOICE, ETC.

a. THE UNIVERSALITY OF MOTION.

THE object of this article is to show that human choice is essentially due to natural influences, and that the properties of the substances of which our bodies are composed and those of the bodies by which we are surrounded, are largely, if not wholly, the causes of our conduct; or more precisely stated, to show by means of natural facts, that the fundamental cause of human choice is the universal motion which pervades all bodies and all space, and which we are unable either to create or destroy. The universal existence of this never-ceasing motion of masses has been abundantly proved by astronomers; and the incessant motion of molecules, of which all bodies are composed, has been sufficiently shown by the experimental labors of numerous physicists, chemists, spectroscopists, etc.—the substance radium is a conspicuous example of this self-contained motion.

As the subject of human conduct is a complex one, this article requires careful reading; its great complexity is abundantly shown by the arguments used in legal trials on moral subjects. In order to arrive at the most perfect truth in any question, and especially in a complex one, we must take the widest view of it, and this can only be done by first acquiring the most comprehensive and suitable knowledge and experience respecting it. The widest view is the scientific one, the narrow is the ordinary one, and each varies in width with the knowledge, experience, and reasoning-power of the inquirer; "what can we reason from but what we know?" It is largely in consequence of deficiency of suitable knowledge and experience that erroneous views arise. A man may be able in one part of science, and yet be unable to take a wide scientific view of the phenomena of human choice. There are all degrees of width of view of a subject, ranging from the two extremes of greatest knowledge and greatest ignorance, and our widest view is still a very incomplete one in consequence of the comparatively limited knowledge even of the most learned men. The total amount of evidence in proof of the truth of the chief principles of science is already vastly larger than the brain of any man can contain;—nevertheless, if we possess sufficient knowledge of the sciences, we must conclude that the attribute of choice is a common property of all bodies.

Many years ago the philosopher Hobbes suggested universal motion as a cause of human conduct, but this could not be proved until such motion was itself discovered;—we now know that every substance is continually moving through space and that its molecules are always in motion. It is evident that as our brains have only limited powers, we cannot absolutely prove the universality or the complete indestructibility of motion, and we have to be content with their immense probability. He who waits for absolute knowledge must in nearly all cases wait forever. As the evidence in support of the universality of natural causation and the indestructibility of motion is vast, and as these principles have never been clearly disproved, I venture to treat them as absolute in this article, and to employ them as a basis of reasoning in all cases.

That the human organism is subject to the laws and principles of all the sciences does not admit of rational doubt. The same great powers which govern inanimate bodies govern us, and determine and limit our power of choice; our abode upon this globe is determined, not by our volition but by the power of gravity. Universal natural causation and indestructibility of motion imply universal compulsion and unceasing action;—in accordance with these principles, all bodies, human beings included, act and react upon each other by their own incessant energy, and their behavior and differences of behavior may be attributed to their movements and differences of movement. Every different metal and compound has different properties and yields a different spectrum, and we know by these differences of their spectra that each has a different group of internal movements; we know also that their properties and spectra are simultaneously affected by change of temperature, so that these attributes in them are intimately connected together. Change of motion frequently involves change of property; even the mere change of visible motion of a body is attended by change of behavior, thus rapid longitudinal movement of a chain imparts to it rigidity and power of resistance to bending; the difference of property of a gyroscope when at rest and when in motion is another example, whilst in motion it resists being twisted. That the chief principles of mechanics pervade human actions is certain, the fact that "a body in a state of motion tends to continue in that state of motion" is as true of man as it is of the worlds in space; it is illustrated by "the force of habit" in us, and by the difficulty we experience in altering our course of conduct, or of obliterating our early impressions. All bodies, ourselves included, resist change under certain conditions, and yield to it under certain others; thus "an old dog cannot be taught new tricks" but a young one can; the condition of age affects the result.

b. GENERAL NATURE OF CHOICE.

Choice is an act of selection, a taking, accepting, or rejecting one thing or course of action in preference to another; it occurs both in dead and living bodies, and like all other properties and actions, it is subject to natural laws and is limited by opposing influences. Every material body during movement chooses the path of least resistance; and it is useless for any man to choose a course of conduct in any case in which the resistance is too great or his power too small. Choice is not necessarily a personal matter, it occurs in dead substances, in man it is often a result of feeling, and occasionally of comparison and inference. All parts of our body are nearly always choosing and rejecting, bone chooses the material for bone, and muscle for muscle, and rejects all others. The great bulk of our acts of choice and rejection occur without our noticing them, and though myriads occur continually we feel very few of them; they are more numerous during our waking state than during sleep, because we are then more active. Choice in us and other animals is largely a cerebral and nervous action, when we choose, either consciously or unconsciously, nerve-substance moves; when choice happens either in dead or living bodies, the molecules move. Similar to all inanimate substances, we obey the law of action and reaction; bodily change produces choice, and by reaction choice produces bodily change; thus if we feel too warm the heat compels us to choose and move to a cooler place.

The attributes of choice and guidance are manifested in the phenomena of astronomical movements, magnetic action, electrolysis, crystal-formation, chemical union, plant-life, etc. Thus the sun guides the planets; the planets guide their satellites; the earth guides meteors and other falling bodies, and each guided body reacts upon its guiding one in a similar manner. A magnet selects particles of iron from metallic mixtures, and guides pieces of iron moving near it; the magnet moves the iron, and the iron reacts upon and moves the magnet. If a piece of zinc is immersed in a suitable solution of mixed salts of zinc, iron, tin, copper, silver and gold, it first selects and guides the gold, and afterwards the silver and copper, to form a metallic precipitate. Similar acts of choice and rejection occur in the processes of electro-gilding, silvering, coppering, and in the electrolytic refining of copper, and we thus obtain purer metals. In the formation of pure crystals of substances from impure liquids, each crystal, during its growth, selects and determines, each to its proper place on its surface, myriads of suitable molecules which go to form its substance. Similar acts of selection, rejection, and guidance happen during the formation of ice from impure water, and the ice is purer than the water. In cases of chemical union in mixed solutions, an acid usually selects the strongest bases first. Plants have similar powers, thus they prefer soil which contains moisture, many will only grow in the light, a few only in the dark, some will only grow where there is common salt, and others where there is zinc in the soil, "fungi in general prefer decaying animal matter":—plants also act and react upon each other and upon us.

In all these cases, and in a multitude of others, both dead and living bodies choose, reject, guide, and control, without the aid of an occult personal ego or being to superintend the process, and there is no sufficient evidence to prove that human brains do not: nevertheless, erroneous ideas to the contrary form a necessary preliminary to true ones in the evolution of mankind, and this so far justifies the existence and persistence of error and untruth. That acts of choice or self-guidance are not proofs of the existence of life, consciousness, volition, "free-will," or intellect, in the body that chooses or guides, is further shown by the circumstance that there are self-regulating clocks, watches, musical boxes, gas-regulators, water-regulators, watchmen's tell-tales, money-recorders, governors of steam-engines, etc., all depending essentially upon the automatic action of natural energy.

It is not sufficiently recognized that we derive our properties and abilities largely from inanimate substances, and that the fundamental rudiments of human conduct, including the ability of choice and self-guidance, can be traced downwards from man through the lower animals and plants, and be detected in minerals and metals; thus, under the influence of light and heat, grass is formed from earth, carbonic acid, air, and water:—under that of hunger, sheep and cows are formed chiefly from grass: and under the same imperative influence, we are formed largely from wheat, water, beef, and mutton. This is a crude outline of the process of conversion of earth, air, and water, together with more or less of their properties, into man and his abilities. Inanimate substances still retain their fundamental properties, and are not destroyed, when they enter into the composition of living plants or animals, oxygen still remains oxygen, and nitrogen continues to be nitrogen, when they become part of the human body; the property of weight is quite unaltered, an ounce of water still weighs an ounce after we have drunk it; common salt in our blood still retains its characteristic property of producing a white precipitate in a solution of a salt of silver; the combustible substance carbon contained in our tissues still has the power of uniting with oxygen, and produces bodily heat; solutions of silver, taken internally as medicines, color the human skin on exposure to light as they do a photographic surface. These examples are sufficient to show that the properties, even of metals and other inorganic substances, are to some extent transmissible to and inherited by man.

An act of choice is essentially the same whether it occurs in a metal, a mineral, a plant, or a man, because it is an act of motion; it is however modified more or less in every different body, evidently by the differences of property of the material structures in which it takes place; thus, a magnet chooses iron; and a man would choose meat and money whilst a horse would prefer hay and water. When it occurs in a metal or mineral we call it a molecular action, when in a live plant it is a vital phenomenon, and when in a conscious animal it is largely a nervous action; in man it is further in some cases an intellectual change, because each man is more or less governed and guided by his own arguments. In all animals and plants it is also partly a chemical and physiological movement.

C. THE COMPULSORY AND AUTOMATIC NATURE OF CHOICE.

The compulsory and automatic nature of choice fully agrees with the chief principles of science and the facts of experience: choice is both compulsory and free; we are compelled to choose by omnipotent energy, and are free in our choice within certain limits; this explains the seeming contradiction of free-will and compulsion. Universal energy, acting under suitable conditions, compels us to accept, and under opposite conditions compels us to reject; and in each case compels us to obey. We are as truly compelled to move as the planets in their orbits, and to choose as we are to exist; probably every action in our body is one of compulsory choice or rejection by the respective organs; we know that nearly every step in life is an unavoidable choice between two or more alternatives, and each selection is determined for us by the strongest influence. We are not only compelled to choose and reject by universal energy acting upon us, but also to accept more or less, the consequences of our acts, whether they are painful or not. We are unceasingly coerced in a multitude of ways, often in opposition to our wishes, and we may rationally conclude that something determines the issue for us whether we perceive it or not. We are compelled by our feelings when we consider it a pleasure or advantage to us, and often by our intellect or other influence when it is prospectively painful or we are unwilling; but in many cases, from a variety of circumstances, we are unable to detect the real cause of our conduct.

Automatic acts of choice and guidance occur throughout the human body; our very life depends upon the production of heat by the spontaneously selective oxidation of our tissues by the oxygen contained in the blood. The various solids and liquids necessary to maintain life, are selected from the food and blood by the spontaneous energy of the various organs, and each different material is automatically guided to its appropriate place; thus nerve selects and guides the material for nerve, and brain that for brain. Nearly all the organs of the animal body also act and react upon each other through the nerves, and, so far as we know, the automatic action of choosing and rejecting attains its highest degree of complexity and completeness in human nerve-substance. Many of our acts of choice and determination *seem* due to some occult spiritual agency, but they only appear so because of our very limited knowledge and ability, we cannot usually perform them and simultaneously watch our performance.

By deeply studying such questions in a scientific manner we are repeatedly brought to the conclusion that the human brain is extremely weak in complex subjects, and that it would require one vastly larger to contain all the knowledge necessary to completely answer complex questions. In consequence of limited power and other circumstances, even conscious automatic action in living creatures does not always select that course which is most conducive to life: thus all animals make mistakes and suffer accidents; even men occasionally poison themselves inadvertently, and the number of errors they commit is extremely great.

In the order of natural evolution of human abilities, automatic choice precedes conscious choice, and becomes the latter when perceived by the senses and compared by the intellect; conscious choice therefore is not an act of creation.

d. CHANGES OF ENERGY IN ACTS OF CHOICE AND GUIDANCE.

Cerebral guidance is an act of change, an alteration of one action or movement by another. Changes of energy are continually happening in all bodies concurrently with alterations of temperature, pressure, contact or presence, etc. of other bodies. Multitudes of such changes are continually occurring in the human body and brain during acts of thought, choice and guidance, and are accompanied by chemical oxidation of nerve-substance and the production and loss of heat. The various forms of natural energy, such as heat, light, magnetism, electricity, chemical power, etc., whether in living men or in dead substances, are mutually convertible, when one form is expended another is produced, and during the change a portion is usually diffused away and lost. Longitudinal motion is changed into circular by the ordinary crank and piston rod, whilst a portion of the energy is converted into heat by the friction and is lost. When the molecular motion of heat is converted into motion of mass by a steam engine, more than eighty per cent. of the original energy of the coal is dissipated. In the dynamo, motion of mass is converted into electric current, and partly into heat which is lost. A magnet loses magnetic energy when it attracts and guides a piece of iron to itself, and regains the energy when the iron is pulled away. A crystal, whilst passing from the liquid to the solid state during its acts of choice and guidance, nearly always loses heat, and in some cases light. When a railway train passes round a curve, friction, heat, and sparks are produced, and the velocity of the train is diminished; on each great line of railway quite a large weight of iron is ground off the rails and wheels each day by the energy expended during guidance of the vehicles.

Not only are choice, guidance, and control, acts of conversion of motion, but they are also intimately related to storage and expenditure of energy.

The demand and supply of power are each in nearly all bodies very variable; in a man the demand is great during the day and small during the night; without an accumulation of it in a latent or potential state he cannot choose or "make up his mind," and without a storage of cerebral impressions in the form of memory he lacks power of self-guidance. In the human body energy is stored up in the blood and tissues during rest, and expended during activity;—in a watch it is accumulated in the spring during winding; and in a steam engine it is stored up in the moving fly-wheel.

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